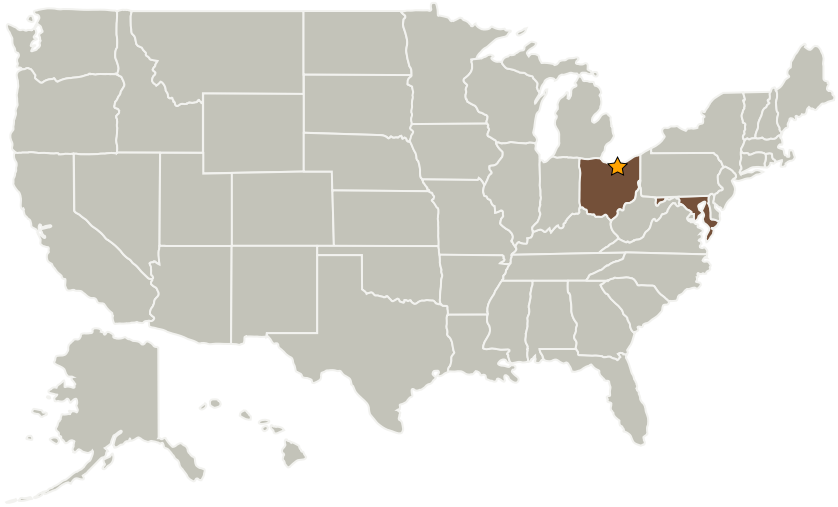
Ultra-Wideband Transceiver for Integrated Communication and Relative Navigation, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

Many space missions require relative navigation between several spacecraft systems or between spacecraft and rovers or remote controlled probes, such as spacecraft inspection, docking, rover control, formation flight, automatic landing of UAVs, and automatic material handling. Ranging and communication are key functions for these types of applications. The ranging update rate and data rate directly affect the performance of relative navigation. UWB radios are very suitable to the above needs because it can be made to be very low power, low-cost, compact, and lightweight. Furthermore, UWB transceivers for relative navigation will have wide field-of-view compared to optical or image based sensors. Another benefit of UWB is that can co-exist with other radio equipment used by the spacecraft without causing co-site interferences or being interfered by other radio transmission. UWB radios have been demonstrated to be able to perform high-speed communication and good ranging rate separately, but the data rate or the ranging update rate will be greatly compromised if one wants to perform UWB communication and tracking simultaneously. The goals of this Phase II project are to develop a superior UWB transceiver that can provide higher update rate and can provide the maximum ranging update and data rate simultaneously.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.6 Optimetrics